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ABSTRACT

This guide to the theory and practice of map classification begins with a discussion of the filing of maps and the function of map classification based on area and theme as illustrated by four maps of Africa. The description of the various classification systems which follows is divided into book schemes with provision for maps (including Dewey Decimal (DDC), Universal Decimal (UDC), International Geographical Union (IGU), and Library of Congress (LC) classifications) and special map-oriented schemes (including Boggs and Lewis (B/L), Parsons, American Geographical Society (AGS), and University of Washington classifications). Seven examples of map classification for Africa and, in particular, Southern Africa are used to show the results of the major systems discussed. The relative performance of the map classification schemes is shown in diagram form and an appendix provides a brief summary of the most important features of each scheme. Twenty-eight references, a bibliography listing the sources used for the various classification methods, and the author's vita are attached. (ESR)

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Map Classification: A Comparison of Schemes

with Special Reference to the Continent of Africa

by

Christopher E. Merrett

University of Illinois
Graduate School of Library and Information Science
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INTRODUCTION

The purpose of this paper is to explain the theory and practice of map classification. In developing this theme, examples will be drawn mainly from Africa, and in particular Southern Africa.

Berwick Sayers described classification as "the arrangement of books on shelves or the systematic arrangement of catalogues...in the manner which is most useful."[1] In the case of maps, the most useful arrangement is by subject content, which has two elements—area and theme.[2] As with all classification schemes, the aim of map classification is to produce a system which serves every library user. The danger of a classification scheme becoming an academic exercise for the benefit of the librarian only is a real one and was summed up by Esdaile, who described classification as "a mentally intoxicating study."[3] Above all, classification must not be confused with simple pigeonholing and the creation of filing devices. Classification notation can and does perform efficiently for call number purposes, even though its primary function is the highlighting of content interrelationships. Filing devices, on the other hand, are simply call numbers added to the classification notation in order to distinguish between many maps classified by the same number. Filing devices thus can be purely arbitrary, but they are often based on physical characteristics of maps such as date and scale. In this case, classification notation and filing devices tend to become confused. On the other hand, when author and title abbreviations are used as filing devices, this confusion cannot arise.

The map librarian must bear in mind a number of practical considerations regarding map classification. First, classification notation fulfills two functions—information retrieval and filing arrangement—and it must be recognized that these two roles may conflict. For example, it is possible that the notation, in providing for information retrieval, can become too complex and fail to satisfy the simpler needs of filing. Classification needs can, in fact, become highly involved, and notation cannot always match them. It is well known that classification, whether represented by the order of catalog cards or of maps in cabinets, is linear, but knowledge in general (and map content in particular) is multidimensional. Second, it has to be accepted that classification is inherently limited in that it provides for a search for any map on a given topic, but does not necessarily retrieve a specific map. Third, the subdivision of all knowledge into a rigid hierarchy often reaches a point of absurdity, and maps are a good example of a format whose classification requires a synthetic approach in the combining of different facets of subject content. On a more mundane level, decisions must be made on the degree of intra- and interinstitutional uniformity deemed necessary.

Perhaps each map librarian should ask the question: Does a library need to classify its maps? Mlle. Foncin at the Bibliothèque Nationale in Paris has been the main proponent of nonclassified map collections. She has argued that the shifting intellectual basis of geography leads to too rapid a dating of map classification schemes, and favors a comprehensive catalog with a fixed-location scheme based on size and form. At the Bibliothèque Nationale maps are stored in five classes, and new maps are simply added in accession number order. Series are kept separately because of their rapid growth and relative size uniformity. Fixed-location schemes can cause problems during a move, but Foncin suggests that they normally contribute to a 30% economy of storage space. In a catalog in which the main headings are based on area (in particular, on hierarchic area headings), there is cause for claiming that classification has been preempted. Most map catalogs, however, are "traditional," based, for example, on the Anglo-American Cataloguing Rules (AACR); and the usefulness of supplementing such catalogs by a classified arrangement of maps can hardly be denied. In those cases where the map catalog is based upon the Boggs and Lewis rules, a classified sequence of maps has to be justified more as an insurance policy and as a service for the user who wishes to browse (described by Mary Pietris as "loitering with intent"[4]) through the collection. There are arguments to support both a catalog's reflection of and its contrast with the physical arrangement of maps. Perhaps most valuable of all is the combination of a fixed-location system with a classified catalog, and such a compromise would seem to accommodate both filing and information retrieval needs.

There are two further possibilities for the arrangement of maps. First, in an archives, for example, maps need to be treated in an identical fashion to the accompanying material. It is essential in these circumstances that maps be stored and classified in context—divorced from the collections of which they form a part, such maps would be meaningless. The identification of these maps often lies in textual material; the maps themselves carry no explanation. Second, there is the "functional" approach to classification, a process by which maps are loosely grouped according to the purpose to which they might be put, e.g., land surveying. This method is sometimes used in government libraries and implies a fixed-location system with broad subject groupings.[5]

THE FUNCTION OF CLASSIFICATION

Having considered these problems and possibilities, one may ask whether a classification scheme can help the library user more than a catalog can; to

what extent a classification scheme can anticipate a reference question; and if classification is necessary at all, in view of the existence of published catalogs and bibliographies. These questions are difficult to answer categorically, but it must be remembered that many catalogs are poor and bibliographic coverage is sparse. Classification is often a feasible alternative to the complete recataloging of a collection if retrieval is considered imperfect and a greater degree of multiple access is necessary. In the final analysis, whether or not a collection is open-access may decide the issue (in some libraries, for example, the open-access collection has no catalog, and information retrieval depends on a classification scheme and shelf registers).

It is generally accepted that the area factor must be the basis of any map classification scheme, ideally divided by theme. Statistical data to support this approach include the 1953 Special Libraries Association survey of 360 U.S. map collections. It was found that 74% of requests for maps were made by area and a further 24% by theme, leaving a mere 2% by date, scale, authority, or title.[6] Brown prophesied these findings admirably when he wrote: "Few questions are asked in which a detached geographic feature or subject...is concerned, without reference to the geographical or political area of which such features are a part."[7]

Is it therefore possible to detect hierarchic relationships between different areas of the world's surface? This is by no means a straightforward task, and it is one over which geographers have been arguing hotly for more than a century. A consensus can be found in favor of a 7-stage breakdown, i.e., by world, hemisphere, continents, continental regions, nations, national regions, and local administrative divisions and regions. The main characteristic of this breakdown lies in its mixture of geographical (also known as physical or natural) and political regions. The former are incontrovertible but hard to define, while the latter are, of course, distinct. These regional types are generally compatible, but problems are provided by two categories—continental regions and national regions. Continental regions are often a matter of perception. The terms *Far East, Near East, Middle East* are familiar to everyone, but to whom are those regions "far," "near" and "middle," and where are their boundaries? Other continental regions are more obvious, but still hard to define: Does Scandinavia include Finland? And should Southern Africa include Mozambique, or even Angola, Zambia and Malawi?

The different ways in which Southern Africa can be perceived are presented in figures 1-4. National regions can be termed directional or geo-historical. In a South African context, directional terms include Far North, Northern

Cape and Eastern Transvaal; while the latter type, geo-historical, embraces Border, Witwatersrand, Stellaland, and Karoo. It remains an open question whether these regions can be defined, and if such definitions would find universal acceptance. Local administrative divisions can also be a problem. South Africa is very precisely divided into magisterial districts, but many of these have been amalgamated into or subdivided by the new black homelands. Thus, the hierarchy has been made lopsided, and a level in the hierarchy must be found for the new units. Islands belonging to mainland nations also present problems with regard to hierarchical levels.

The basis of most classification schemes lies in the division of continents into countries. It could be argued that this approach is too politically oriented, but it has cartographic warrant, as most maps are published by government agencies which produce maps of areas within their jurisdictions. The main problem is the changing complexion of the political map, but even in Africa the postcolonial boundary pattern has remained remarkably stable. Although name changes have been frequent, a succession of names refers to precisely the same area. A main feature of Africa has been the breakup of regional groupings, such as the Central African Federation, East Africa and French West Africa, but these can now be viewed as continental regions with a continuing economic and historical basis. Outdated terminology in some classification schemes can provide for groupings still "extant as regions," as Boggs comments.[8] It is in the grouping of countries to create regional entities that problems arise, and the different approaches to Africa can be seen by comparing maps in figures 1, 3 and 4. An entirely different approach is that of dividing continents on a physio-geographic basis to create natural regions. These divisions have provoked great controversy among geographers, based as they are on climate and vegetation. There is no doubt that such areas exist, but boundaries are highly contentious, with regions tending to merge into one another leaving "gray" border areas rather than precise lines. The International Geographical Union (IGU) admitted, "Natural regions [are] as a rule not clear enough to suggest their general applicability as a means of regional classification."[9] Figure 2 illustrates this approach.

Theme is often inextricably tied up with area in the title of a map, e.g., "European Economic Community" and "Great Wall of China." Maps are popularly thought of as a geographer's tool, but the scope of thematic mapping is infinite and applicable to all disciplines. One of the most famous maps is one of London in the 1840s which correlated open sewers and outbreaks of cholera. At present, a doctor at the London School of Hygiene and Tropical Medicine is plotting cholera outbreaks reported by the World Health Organization and is comparing them with airline flight

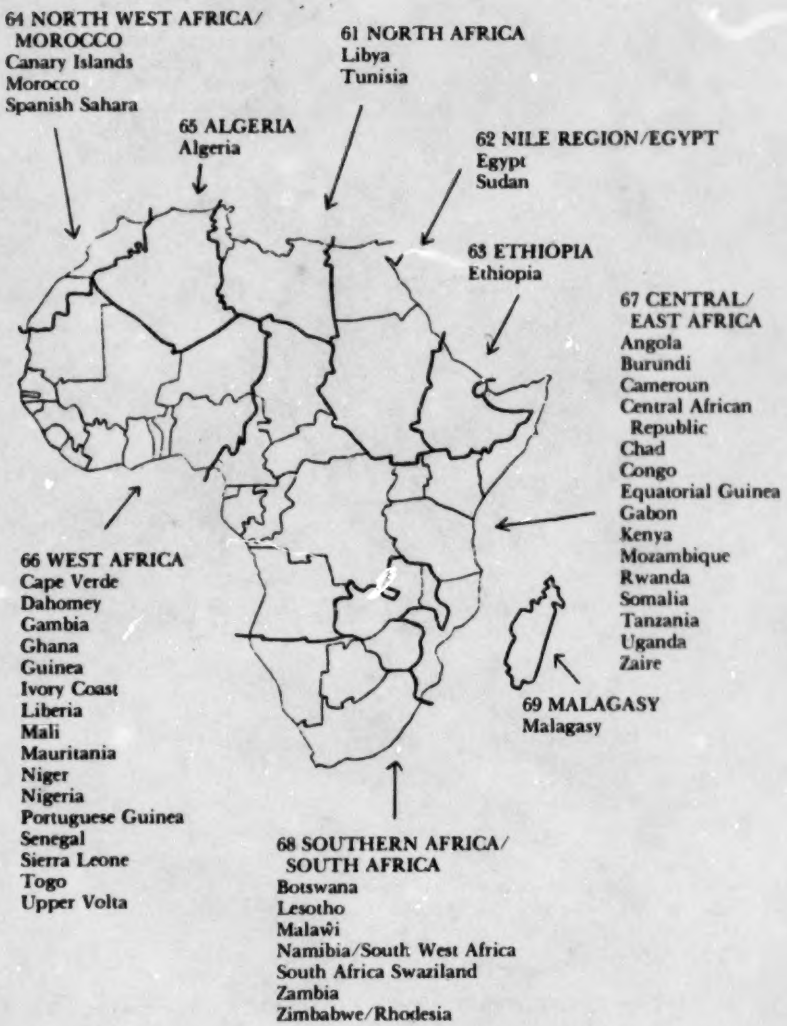


Fig. 1. Dewey Decimal Classification of Africa

6-9.0 Southern High Africa
.1 Malagasy
.2 Eastern High Africa
.3 Central Africa
.4 N. Guinea coastal regions
.5 Sudan regions
.6 Sahara
.7 Mediterranean/Canary Islands

6-9.0 SOUTHERN HIGH AFRICA
.00 Southern Cape
.01 Drakensberg
.02 Coastal Mozambique
.03 Highveld
.04 Cape Middleveld
.05 Kalahari basin
.06 South West Africa highlands
.07 South West Africa coast
.08 Luangwa/Zambia basin
.09 S. Equatorial rise

N.B. Only SOUTHERN HIGH AFRICA is shown in detail on this map.

Fig. 2. International Geographical Union Classification of Africa

Fig. 3. Library of Congress Classification of Africa

500.1 British Africa	502 Northern Africa
500.3 French Africa	503 Western Africa
500.4 German Africa	504 Central Africa
500.5 Italian Africa	505 Eastern Africa
500.7 Portuguese Africa	

Fig. 4 Boggs and Lewis Classification of Africa

paths, hoping to prove a connection between the disease and waste matter ejected from aircraft.[10] The growth of thematic mapping has been one of the most remarkable developments in cartography during the last 30 years.

There are good reasons for equating geography and maps, because the former is an eclectic discipline which studies the distribution of phenomena, resultant patterns and their causes. This results in the assumption that a special geography classification scheme will automatically suit maps as well. Geography as a discipline has suffered in general book classification schemes, partly because of the rigidity of the latter, but also because of the failure of geographers to define their subject adequately. However, as Boggs points out, "maps are not simply books in another format."[11] There is some validity in the simple assertion that maps represent a *statement*, books an interpretation. The paradox of map thematic content is that it involves highly specific items of information which are gathered in map form under very broad headings. The specific level is theoretically no problem, but it is easy to assign too general a classification term. The derivation of general concepts is difficult, and few classification schemes, even those specially designed for cartographic materials, provide a place or notation for "topography." A large proportion of maps are simply topographic (showing distributions of physical and human features of the landscape), but in most schemes, to user computer terminology, topography is the "default" theme. Boggs points out that specific topics can be combined with totally different broad subject matter on the same map, and cites the example of a geological map which also carries valuable railway information.[12] The only way both these topics could be retrieved would be by means of a classified catalog with added entries. Thematic classification must obviously be based upon cartographic warrant, in view of shifting subject emphasis and the growth of interdisciplinary work. A scheme has to accommodate both the general and the specific, but the latter level can probably be adequately recorded only through "form" type cataloging, such as that used at the U.S. Army Map Service, with its 198 categories. Maps with a large amount and variety of specific thematic content are likely to be classified under general headings. Except in unusual circumstances, it is likely that thematic classification for maps will be secondary to area classification.

Whichever approach to map classification is used, the map librarian is bound to employ a certain amount of bias reflecting the retrieval needs of a particular institution. This covers the decision of whether to classify maps according to apparent content, or to the purpose to which they might be put. The classification slant will also be determined by the purpose of the collection and the nature of its users, and proximity of complementary collections.

A typical classification scheme has an alphanumeric notation, with area represented by numbers and theme by upper- and lowercase letters, prefixed by filing devices, e.g., s570 caa (the Boggs and Lewis notation for a topographic series of South Africa). There are various methods of classifying the classification schemes themselves. For the purpose of this paper, a simple method will be employed, dividing them into book schemes with provision for maps, and special, map-oriented schemes. The salient features of each are enumerated in the appendix and full descriptions are found in the sources in the bibliography.

BOOK SCHEMES

The Dewey Decimal Classification

In Dewey, maps are allocated the notation 912: "Graphic representations of surface of earth and of extraterrestrial worlds."[13] This is a division of the totality of knowledge—a contradiction in terms, since maps are a vehicle for the portrayal of knowledge and ideas, not an end in themselves (unless viewed as an art form). There has been resistance to the use of Dewey for map classification, perhaps because of (apocryphal?) stories which circulated about British public libraries that dissected their maps, bound them, and printed "912" on the spine (thus tidy shelves and orderliness triumphed over the needs of map users). The standard subdivisions of area in Dewey do, however, have much to commend them. The basic pattern is that of continents divided by countries, which are grouped regionally (see fig. 1). The schedules make provision for the ancient world as well as the modern, and list old terms and discontinued numbers. The scheme makes use of both political and geographical groups at continental and national levels. Geographical regions in Africa, for example, are represented by Blue Nile (—6264) and Witwatersrand (—6822). Countries are broken down only to provincial level in the case of Africa, but the decimal notation facilitates local extensions.[14] The utility of notation for old colonial patterns has already been noted; Dewey provides, for example, for "former Belgian territories" at —675. There are, however, many flaws in Dewey's area classification which discourage its use for maps. There is a tendency to notational inertia in spite of the *Additions, Notes and Decisions*.[15] Mary Pietris satirized the introduction into Dewey of a more logical area hierarchy for the British Isles:

> Catalogers the world over were stunned to hear of the sudden dismemberment of —42....ambushed and violently mutilated by the combined forces of DCEPC, FP and the BNB (organizations similar to the CIA in function and intent) while quietly working on its job of collecting

> materials about Great Britain and England in the same classification number....This whole sordid affair is officially justified by pointing out that England and Great Britain are not actually the same thing....While absolutely true, these justifications do not console the millions of persons who knew and loved —42....Anguished cries have pierced the air in the cataloging departments....[18]

Some of the worst defects of Dewey are highlighted in the section on Africa: the schedules have a habit of confusing countries and regions. South Africa (Union and Republic) has the same notation as Southern Africa (—68), as do Countries of the Nile and Egypt (—62), with a resultant loss of hierarchical symmetry. There is a poor spread of notation (— 61 to —69) through the regions of Africa. North Africa is heavily favored (Libya and Algeria, for example, are each assigned separate regions), and the majority (82%) of African countries are forced into the section —66 to —69, resulting in strange regional bedfellows and long numbers. The results in Europe are even more bizarre. A logical sequence of regional groupings —41 to —48 is followed by —49, which operates as a miscellaneous repository for all countries which do not fit easily elsewhere. Thus, one finds the Benelux nations, Switzerland, Greece, Rumania, and the Balkans collocated. Dewey is heavily biased toward the United States, with 63% of the 235 main notational divisions devoted to that country. It is fair to conclude that the Dewey area schedules are poorly balanced in terms of hierarchy and notation.

Dewey allows no synthesis of the two main elements of map content, area and theme, which are mutually exclusive. Maps can be classified by theme by following the instruction to divide 912.1001—912.1899 by the whole schedule. Thus, 912.1553282 represents a geological map of oil deposits, but gives no clue to the vital question: Where? A further drawback to the thematic approach is that Dewey has no specific place for geography, which is assumed to be related only to the physical features of the earth's surface, other topics being scattered through the schedules. This is not a decisive drawback, but it restricts the terminology available to describe cartographic material. The classification of geography in Dewey could be described as promiscuous, although, since the publication of the sixteenth edition, there has been some recognition of the eclectic nature of the discipline.

The Universal Decimal Classification

The Universal Decimal Classification (UDC) also has a decimal notation which is, in fact, based on Dewey, but UDC considers geography as an independent discipline with the total landscape—physical and human—

as its foundation. UDC has scope for the synthesis of different subject facets, and can be considered a more sophisticated classification system. The notation 912 is used for maps, and is subdivided by standard area subdivisions and common auxiliaries of form. UDC tends to perpetuate Dewey's lopsided notation and poor definition of regions in Africa, although South Africa and Southern Africa are assigned separate numbers. UDC has retained African colonial groupings and can be considered an international classification scheme, less biased toward the United States than is Dewey. Theme can be taken from anywhere in the schedules, and indicated by using the colon device combined with 912 and the area facet (which is enclosed in parentheses). A further facet is the common auxiliary of form which enumerates the multitude of ways in which maps may be produced, e.g., pocket maps (084.33), profile maps and sections (084.37), and atlases (084.4). Although the resultant notation can be complex, the UDC classification allows a wide variety of approaches to suit different circumstances (e.g., area/theme/form, theme/area/form, and area/ *or* theme/form).

The International Geographical Union Classification

The UDC scheme was amplified by the International Geographical Union (IGU) commission of 1964 which took on the task of constructing geography-oriented schedules which would allow synthesis. The commission noted that: "What in the past has been registered as geography in libraries is very often not geography but general knowledge relating to certain areas."[17] The report, naturally enough, concentrated on geography as a whole, but in three areas its recommendations directly affected maps. First, common auxiliaries of place were developed, covering human regions (orientation, political, ethnographic, and general), grid regions (based on latitude and longitude), and physio-geographic regions (climate and vegetation, relief, and geomorphology). Second, UDC's common auxiliaries of form were expanded to cover scale (nine ranges), types of representation, types of reproduction, storage form, and three-dimensional representations. Third, and most importantly, the IGU devised an area hierarchy based on physio-geographic regions (see fig. 2). This is perhaps the most original of all area classifications, but whether it is relevant to the general map collection and reflects cartographic warrant is a matter for debate. Undoubtedly this is a geographers' approach, best suited to a research library.

The Library of Congress Classification

Maps, together with geography and anthropology, are covered by class G in the Library of Congress (LC) classification. These schedules, based upon a specific collection, reflect cartographic warrant. Areas are allocated blocks of numbers, usually five numbers to a block: the first covers general maps; the second, subject maps; the third, division by natural regions; the fourth, division by political regions; and the fifth, cities. Thus, within each block of numbers representing an area, there is a hierarchy of maps arranged by theme or regional level.

The area classification comprises continents divided politically and grouped regionally. Africa, for example, is divided into five balanced and logical regional groupings (see fig. 3). This feature, however, is marred by the illogical order of countries within regions. For example, Southern Africa has the order: South Africa, Cape Province, Orange Free State, Natal, Transvaal, Rhodesia, Zambia, Lesotho, Swaziland, Botswana, Malawi, and South West Africa/Namibia. In other areas of the world, regions are given highly ambiguous names, e.g., West North Central United States of America. Some libraries evade this irrationality by ignoring the structure provided by LC and ordering countries alphabetically. LC does, however, provide a quarterly listing of additions and changes,[18] notes defunct names and notation, and provides schedules for nonlocalized (i.e., theoretical, imaginary and unidentified) maps. The LC schedules give detailed instructions regarding the allocation of numbers from five-figure blocks—for example, the case of a feature falling into more than one regional category. Cutter numbers are used for hierarchical subdivisions, such as cities and towns. In a list of South African cities, Cape Town could be rendered C1; Johannesburg, J15—a highly flexible and hospitable system. One drawback with LC is that town plans are subsumed directly under country and the lack of the intervening administrative division—except in the case of North America—means a loss of hierarchical symmetry.

LC has 20 pages of thematic classification, and provides 17 classes specifically designed for maps with an alphanumeric notation. Some classes are poorly developed (for example, oceanography), while topography yet again functions as the default class. Maps on individual features are classified under their specific names, with only distribution maps being given thematic classification. LC also provides guidance on the creation of filing numbers, using date and author-equivalent. The latter is coded by a Cutter number, but it is arguable that acronyms are more useful than Cutter numbers. In other words, TS may be more readily acceptable as a

substitute for Trigonometrical Survey, than is, say, T9. As with all map classification schemes, the function of filing numbers or devices is to distinguish between many maps classified at the same number. LC also allows for form notation, the prefix "s" being used to denote map series which are filed separately in scale order.

MAP-ORIENTED SCHEMES

The Boggs and Lewis Classification

The Boggs and Lewis (B/L) scheme can be considered the original response to the need for a published definitive map classification scheme. Boggs, an academic geographer, published his views on geography classification as early as 1937,[19] and collaborated with Dorothy Lewis of the Library of Congress to produce a map classification (and cataloging) scheme. The American Library Association refused to publish the scheme, because it did not, "in the opinion of the committee, conform to established...practices."[20] It was not until 1945 that the Boggs and Lewis scheme, the basis for many later homemade arrangements, was published by the Special Libraries Association.

Area in the B/L scheme is represented by a decimal notation with continents divided by countries. The latter are distributed in a fashion described by Nichols[21] as an "atlas arrangement." Europe is assigned blocks 200 and 300, thus avoiding the overcrowding and false relationships inherent in Dewey. In Africa the regions are logical and notationally well balanced (see fig. 4). Africa is also divided by compass directions and by colonial groupings. The influence of the old colonial pattern is seen in sections 530 and 540, which cover West Africa, divided as former French West Africa (540) and the rest (530). South Africa is allocated a number separate from Southern Africa. The thematic notation "fab" is used to link two countries where boundaries are the main topic, while city maps have a reserved notation and are alphabetized by name. This is an American-published scheme, but no special emphasis is given to North America, and its utility is increased by an area index and index map.

Thematic classification is map oriented, with ten main classes. There are some areas of overlap, and the common problem of where to classify topography also arises in B/L. Notation consists of a group of up to five lowercase letters representing about 500 specific terms, e.g., reliability (bp), forts and posts (hkcmf), plebiscite areas (fdc), forced migration (ecq), and icebergs (cei). The B/L manual also covers cataloging, and for classification purposes it is possible to use the catalog subject headings as an index

to the thematic classification. For example, 11 types of boundaries are listed, including arbitration, award, claim, disputed, and undetermined boundaries. Form notation is provided ("s" for series and "w" for wall maps), and there is guidance on the creation of filing numbers using date of situation and author-equivalent codes.

The Parsons Classification

The scheme devised by E.J.S. Parsons has all the characteristics of in-house development, being tailored to the requirements of the War Office, London. It is also used, however, by the Bodleian Library at Oxford, which houses a national map collection. The area classification is based on continents, represented by uppercase letters. Continents are divided politically in a nonhierarchic arrangement, although there are some groupings, especially in Europe—for example, the Balkans and Scandinavia. Some coutries are initially divided by orientation; others, like South Africa, only by administrative divisions (in the case of South Africa, by magisterial districts). The notation makes no provision for national regions in South Africa, but enumerates Canada's lakes and regions before its provincial and other political units. City plans are provided for as a group after the political subdivisions, arranged alphabetically. Thus, there is no continent/country, nor country/province/city hierarchy. There is a valuable index, but the scheme is very dated, there being no notation for Eire or Pakistan, nor a broad number for the USSR. The area classification occupies 400 pages, enhanced by an index to islands which gives the sovereignty and class number of each.

Area notation is followed by filing numbers and simple accession numbers, thus creating a multiplicity of open-ended systems. Sets and series are stored separately and arranged by scale. Blocks of numbers are allocated to series according to scale, which introduces an element of inflexibility. The age of this scheme is revealed by its poor provision for thematic classification. The assumption is made that nearly all maps are topographic—a function of the War Office collection's purpose and the scheme's age. Provision is made, however, for the names of explorers and expeditions, and for five themes—i.e., boundaries, communications, economics, ethnography, and geology—but there is no notation.

The American Geographical Society Classification

With the American Geographical Society (AGS) system, area is again based on a decimal notation, with the primary classification by continent. The United States has, however, a primary notation of its own, and inexplica

bly, it is found nowhere near the rest of North America. Not all continents have a hierarchic arrangement of countries, but Africa has a logical order in certain areas, with interpolated continental regions such as Sahara and Sinai. Central Africa comprises Zambia, Rhodesia, Malawi, Botswana, and Mozambique; while Southern Africa consists of the Republic, Namibia, Swaziland, and Lesotho. The groupings for the rest of Africa, however, are less obvious. By contrast, the Canadian provinces are arranged systematically from east to west. Within each country, the filing order is: (1) general, (2) sets, (3) regions, (4) town plans, (5) wall maps, and (6) atlases. Category three tends to become overloaded. Islands are not always treated logically, the Channel Islands being classified with the Atlantic and far removed from Great Britain.

Thematic classification comprises 12 classes (not unlike the B/L scheme) represented by uppercase letters. These classes are weighted in favor of physical phenomena by the order of seven to four, with one miscellaneous class. In common with the other special map classification schemes, prefixes are provided for location and form.

The University of Washington Classification

The University of Washington classification is a simple process known as "titling," involving the extraction of key facts and the coding of these in a fixed order. This is a procedure common to all classifications. The distinctive feature of the Washington approach is that instead of notation, natural language is used for coding. The classification order is area divided by scale, theme and date. This order could be altered to suit another institution. Areas and themes are taken from authority lists, and although this is a simplistic approach, it would be advantageous for a small, nonintegrated collection.

All of the schemes discussed are relevant to a general collection of maps. It is pertinent to query whether the needs of all collections are the same. Collections of early maps (defined by the British Standards Institute as pre-1825, by the Bodleian as pre-1850, and, in general, as maps published prior to the all-pervasive influence of government mapping agencies) are unlikely to be open access. At this stage of cartographic history, most maps were topographic with little specific thematic content. Bearing these factors in mind, a location symbol will probably suffice, if the catalog is comprehensive.

In local history collections, a classification scheme must accommodate the nineteenth-century manuscript map as readily as the latest Trigonometri-

cal Survey sheet. The requirement is clearly for a highly detailed scheme; otherwise, all maps would have the same number. A common solution lies in the expansion of existing schedules, substituting the common notation by a succinct symbol. For example, in a collection of maps of the Cape Province, the Dewey notation 912.687 could be replaced by a letter of the alphabet, to which is added the expanded notation. Often, area classification in a local history collection is applied to all materials, textual and graphic, and the same applies to the collections of map publishers.

It is, of course, dangerous to base an expanded area classification on political and administrative divisions, since these are prone to change. It is preferable to use fixed coordinates or a national grid. The sheet numbering of the South Africa 1:50 000 series uses coordinates of latitude and longitude and constitutes a classification scheme in itself. For example, a one-degree square in the Natal Midlands is designated 2930. It is divided into 16 15-minute squares, and the Pietermaritzburg sheet is, thus, 2930 CB. British practice is to use five-kilometer squares, with one-kilometer squares in urban areas. Classification numbers for urban areas may have to be general to accommodate historical change. Such a classification has the advantage of logical order, but it needs a place name index (although in some circumstances, a detailed index map would suffice). The identification of maps by coordinates could become an international standard, although this practice would be better suited to the specific rather than the general level.

COMPARING THE SCHEMES IN PRACTICE

Specific maps can serve as examples to show the results of classification by the major schemes discussed. The aim of this exercise is to show the performance of the various schemes in handling a variety of thematic content. Seven maps represent the area hierarchy from continental to local administrative levels, from Africa as a whole to Table Mountain.

Map I is dealt with in greater detail than maps II-VII, as a number of points are made in relation to this example which apply equally to the others. For self-evident reasons, these are not repeated. The mutually exclusive approaches of Dewey are clearly shown. In contrast, the multiple approach of UDC is evident, with four possible combinations of facets shown (for maps II-VII, only basic area and thematic approaches are dealt with for the sake of economy). For map I, the optional additions provided by IGU are also demonstrated (e.g., notation for general area types, scale and specific form). In each example, filing devices based on the characteristics of the

map are given. These involve use of the map publisher, date and scale. Each map is dealt with in sequence.

I. *Africa 1976*. Pretoria, Africa Institute, 1976. 1:20 000 000
Area: Africa and adjacent islands.
Theme: Types of government. Insets show official languages and communications.

DDC	912.6 *or* 912.1321	Map-Africa *or* Map-Forms of states
UDC	912(6)"197"(084.32)	Map-Africa/1970s/Sheet map
	342.3(084.32)	Forms of government/Sheet map
	342.3:912(6)(084.32)	Forms of government/Map-Africa/Sheet map
	912(6):342.3(084.32)	Map-Africa/Forms of government/Sheet map
IGU	912(6-9)	Map-Africa
	(-2/-5)	Political units in general
	(084.3-16)	Scale 1:1 000 000 to 1:20 000 000 (maps of continents)
	(084.3-52)	Unmounted
LC	G8200 F81	Map-Africa/Forms of government
B/L	500 fca	Africa/Forms of government
PAR	E1 Boundaries	Africa/Boundaries
AGS	300 B	Africa/Historical & political

Filing devices: A.I.; 1976; 20 000.

Each scheme has a distinct number for the continent of Africa. Treatment of theme is also remarkably consistent. The poor treatment of theme by Parsons is evident, as is the lack of in-depth thematic classification in the AGS scheme. It must be remembered that these examples of classification notation are based upon the published schemes generally available to the map librarian. They make no allowance for the fact that the published schedules may be abridged, the AGS scheme being a case in point.

II. *Orange River project/Oranjerivier-projek*. [Johannesburg], Shell, [196?].
Area: Southern Africa (including Namibia, Lesotho, Swaziland).
Theme: Irrigation areas, dams, tunnels, pipelines, canals, hydro-electric power plant.

DDC	912.68 *or* 912.1627	Map-Southern Africa *or* Map-Hydraulic engineering

UDC	912(68)"196"(084.32)	Map-Southern Africa/1960s/Sheet map
	627.8(084.32)	Dams/Sheet map
IGU	912(6-9.0) ...	Map-Southern High Africa ...
LC	G8480 N2	Map-Southern Africa/Hydraulic engineering (Dams)
B/L	570 ghh	Southern Africa/Hydraulic engineering
PAR	E1:7 Economics	Southern Africa/Economics
AGS	370 H	South Africa/Hydrography

Filing devices: SHELL; 196?.

Each scheme has notation for Southern Africa, which is a continental region. The exception is AGS. Thematic coverage, however, is more varied. UDC provides notation for the specific theme, whereas DDC, LC, B/L, and AGS use an acceptable broad heading. The Parsons term is perhaps too broad to be useful.

III. *African reserves in South Africa/Bantoereservate in Suid-Afrika*. [Johannesburg], South African Institute of Race Relations, 1969. 1:1 267 000 (approx.)
Area: Republic of South Africa except parts of Cape Province.
Theme: Roads, railways, settlements, boundaries, scheduled areas, quota land acquired by trust, African released land still owned by whites.

DDC	912.68 *or* 912.1572/.133332	Map-Southern Africa or Map-Ethnology/Land tenure
UDC	912(68.01)"196"(084.35)	Map-South Africa/1960s/Wall map
	333.013(084.35)	Land ownership/Wall map
IGU	912(6-9.0) ...	Map-Southern High Africa ...
LC	G8501 F7	Map-South Africa (subject)/Administrative & political
B/L	572 gbbd	South Africa/Land ownership
PAR	E54 Boundaries	South Africa/Boundaries
AGS	370 E	South Africa/Economics

Filing devices: SAIRR; 1969; I 267.

It is at the level of South Africa that area classification begins to break down. UDC, LC, B/L, Parsons, and AGS all have distinctive notation, but DDC makes no distinction between South and Southern Africa. The same applies to IGU, which is based upon physio-geographic regions. The difference is most clearly seen by comparing UDC and DDC. The handling

of thematic content is also varied. DDC, UDC and B/L provide accurate terminology, but LC, Parsons and AGS are, to varying degrees, less precise. LC notation is distinctive, demonstrating the qualification of the area notation (a five-figure block of numbers) by the general type of subject content (G8501). In this case, it draws attention to a thematic map—other possibilities are shown by maps IV-VII (natural regions, towns).

IV. *Die Kiesprovinciën en Kiesdistricten in die Kaap Kolonie.* Kaapstad, Jacques Dusseau, 1897. 1:3 800 000
Area: Cape Province as of 1897 (lacks Pondoland).
Theme: Electoral districts, railways.

DDC	912.687 *or* 912.13242	Map-Cape Province *or* Map-Elections
UDC	912(687)"189"(084.32)	Map-Cape Province/1890s/Sheet map
	342.828(084.32)	Electoral divisions/Sheet map
IGU	912(6-9.0) ...	Map-Southern High Africa ...
LC	G8511 F9	Map-Cape Province (subject)/Political campaigns, elections
B/L	572 fbe	Cape Province/Electoral divisions
PAR	E55 Boundaries	Cape Province/Boundaries
AGS	370 B	South Africa/Historical-political

Filing devices: DUSSEAU; 1897; 3 800.

All schemes provide for a provincial division of South Africa, except AGS (see the proviso made for AGS under map I) and IGU, which does not recognize political boundaries. DDC, UDC, LC, and B/L all deal with theme adequately, whereas the AGS and Parsons terms are, again, too general except for use in small collections.

V. *Cape Peninsula: Guide map/Kaapse skiereiland: gidsplan.* Cape Town, Mapcape, 1974. 1:62 500
Area: Cape Peninsula.
Theme: Topography—physical and human (communications, settlements, nature reserves, drainage, etc.). Inset shows Cape railways.

DDC	912.687 *or* 912.15514	Map-Cape Province *or* Map-Geomorphology
UDC	912(687)"197"(084.33)	Map-Cape Province/1970s/Pocket map
	551.4(084.33)	Physical geography/Pocket map
IGU	912(6-9.00) ...	Map-Southern Cape ...

LC	G8512 C2	Map-Cape Province (natural region)/Physiography
B/L	572 caa	Cape Province/Distribution of land and water
PAR	E55	Cape Province/[Topography implied]
AGS	370 A	South Africa/Physical

Filing devices: MAPCAPE; 1974; 62.5.

All seven schemes deal poorly with area. Cape Peninsula represents a national region, but none of the schemes except IGU can provide notation which is not also used for Cape Province as a whole (see map IV). IGU provides a change of notation, but this is merely a new level of the physio-geographic hierarchy which covers the whole of the Southern Cape and is not distinctive to Cape Peninsula. This map introduces the theme of topography, which, as noted before, is poorly handled by all schemes. The terms provided range from simply "Physical" or "Physical geography" to "Physiography," "Geomorphology," and "Distribution of land and water." In Parsons, topography is simply implied—an approach which has much to commend it, given the range of terminology used by other schemes.

VI. *Street map of Cape Town/Straatkaart van Kaapstad*. Johannesburg, Map Studio, 1970. 1:20 000
Area: Cape Town and suburbs.
Theme: Built up areas, vegetation, roads, railways, suburban boundaries.

DDC	912.6871 *or* 912.16257	Map-Cape Town *or* Map-Roads
UDC	912(6871)"197"(084.33)	Map-Cape Town/1970s/Pocket map
	625.71(084.33)	Roads/Pocket map
IGU	912(6-9.00) ...	Map-Southern Cape ...
LC	G8504.C1 F2	Map-South Africa (town)/Roads
B/L	572.921 gmbb	Cape Province (cities CA-CAZ)/Roads
PAR	E55:29 Communications	Cape Town/Communications
AGS	370 D	South Africa/Transport

Filing devices: MAPSTUDIO; 1970; 20.

All schemes make provision for a city plan. The notation given for DDC and UDC does not appear in the published schedules, but the use of —6871 for Cape Town is generally accepted and understood in South African

libraries. IGU has reached the limit of its physio-geographic subdivisions, and cannot distinguish between Cape Province and Cape Town. LC assigns a specific number from the South Africa block for towns (note that the hierarchy is lost at this point and all South African town plans are subsumed under country rather than province), and uses a Cutter number (-C1). The Boggs and Lewis system employs a similar approach, adding the suffix .9 to the notation for Cape Province, and a number for towns starting with the letters CA. Thus, Cathcart and Calvinia would receive the same classification number as Cape Town. Parsons uses the notation for the magisterial division of Cape Town, whereas AGS again can provide only South Africa. Thematic treatment is remarkably consistent, but Parsons and AGS produce only general terminology.

VII. *A Map of the Table Mountain (as we found it in the year of grace 19''4) with advisory notes, sketches of the principal flora, fauna and views ..* drawn by Peter Slingsby. Lansdowne, Mapcape, 1974. 1:12 500
Area: Table Mountain.
Theme: Topography—human and physical.

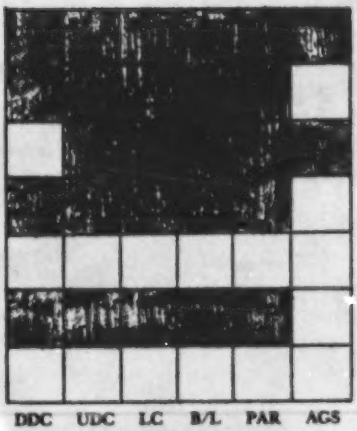
DDC	912.6871 *or* 912.15514	Map-Cape Town *or* Map-Geomorphology
UDC	912(6871)"197"(084.33)	Map-Cape Town/1970s/Pocket map
	551.4(084.33).	Physical geography/Pocket map
IGU	912(6-9.00) ...	Map-Southern Cape ...
LC	G8512 C2 *or* G8504.C1 C2	Map-Cape Province (natural region) *or* Map-Cape Town/Physiography
B/L	572 caa	Cape Province/Distribution of land and water
PAR	E55:29	Cape Town/[Topography implied]
AGS	370 A	South Africa/Physical

Filing devices: MAPCAPE; SLINGSBY; 1974; 12.5.

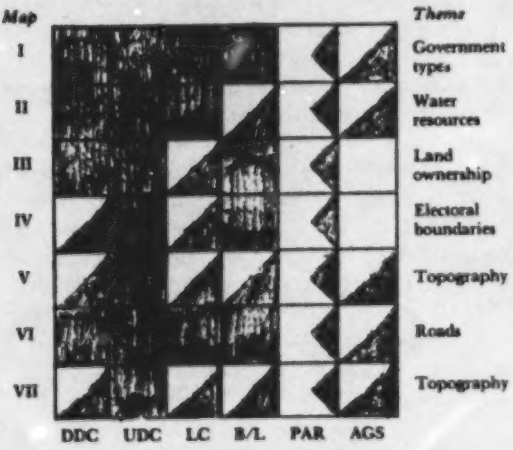
None of the schemes provides notation for a small natural region such as Table Mountain. The most precise is offered by LC, which specifies a natural region of Cape Province (G8512). All other notation represents Cape Town. Thematic content is topographic, which has already been dealt with under map V.

The relative performance of the classification schemes is given in figure 5. None of the schemes accommodates all of the area types tested. UDC, LC,

A. AREA



B. THEME



KEY

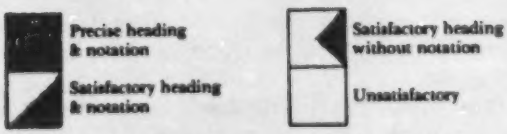


Fig. 5. Relative Performance of Classification Schemes

B/L, and Parsons each accommodate five types; DDC, four; and AGS, two. IGU, as previously mentioned, is oriented toward a physio-geographic, research approach. There is a general tendency for coverage to be less complete as the area hierarchy narrows. Only UDC consistently provides precise terminology with notation for thematic content. The performance of DDC, LC and B/L is good but occasionally wayward. Parsons provides loose terminology without notation, and AGS terms, although given a notation, are very general.

CONCLUSION

It would be facile to conclude that there is a "best" classification scheme for maps. Clearly, different schemes suit different circumstances, and an attempt has been made to identify these circumstances in the summary of classification characteristics provided in the appendix. Some of the different approaches necessary have been emphasized in the discussion of the organization of old maps and local history collections. It is also apparent, however, that general collections will vary in their classification needs, and situations could no doubt be found for which each of the eight schemes discussed earlier would be the optimum. Which scheme is best is dependent upon so many local variables that generalization is futile. Nevertheless, there are general comments which have validity. First, classification is helpful in most map libraries. Second, we have all too little quantitative data upon which to base our assumptions about the way in which users ask or search for their maps. Third, it must always be remembered that published classification schedules can be expanded to meet local requirements, although some schemes are more accommodating than others. There is no reason why a map library should not take preferred approaches from two or more schemes and combine them into a hybrid. The most justifiable approach would therefore seem to be the development of a system best suited to local circumstances. Development of national or international standards for map classification, however, is a desirable objective.

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APPENDIX

Summary of Map Classification Schemes

Dewey Decimal Classification (DDC)

Notation: Numeric.
Area: Primary classification by continent/country, with some geo-physical regions. Regional grouping of countries is poor. Notation is distributed badly, with the major emphasis on North America. System is adaptable, can be built up locally and is updated frequently.
Theme: Divide like whole schedule. Suffers from traditional inadequate treatment of geography and lack of specific thematic classification for maps.
Scope for Area-Theme Synthesis: None.
Bias: American. Book oriented.
Suitability: Large libraries based on DDC with small- or medium-sized map collections.

Universal Decimal Classification (UDC)

Notation: Numeric, with punctuation for facets.
Area: Similar to DDC, but has eliminated some anomalies. More international in approach (IGU provides option of a physio-geographic classification).
Theme: Divide like whole schedule—but geography is treated as an independent discipline and provides appropriate classification headings.
Scope for Area-Theme Synthesis: Possible—covers also common auxiliaries of place, time, form, while IGU expands auxiliaries of place and form.
Bias: International. Book oriented.
Suitability: Scientific or research libraries in which complexity of UDC notation is accepted.

Library of Congress Classification (LC)

Notation: Alphanumeric.
Area: United States-biased, but breakdown of continents by countries is good, although ordering of countries within regions is illogical at times. Extension of classification through Cutter numbers. Flexible. Hierarchy is not always maintained—e.g., city maps.
Theme: 17 classes, specifically for maps. Topography considered general.
Scope for Area-Theme Synthesis: Area/thematic synthesis + call no. facility (based on date, authority, form).
Bias: American. Specifically map oriented within limitations of a book classification scheme.
Suitability: Libraries already using LC. Only general scheme with good provision for maps.

Boggs and Lewis Classification (B/L)

Notation: Alphanumeric.
Area: Continents/countries—"atlas arrangement." Countries/orientation & administrative divisions. Good spread of notation. Area index + map.
Theme: 10 classes, 500 specific terms. Detailed, specially devised for maps.
Scope for Area-Theme Synthesis: Wide scope within limitations of area & thematic schedules. Notation for form.
Bias: International. Special map classification scheme.
Suitability: Medium-large distinct collections.

Parsons Classification

Notation: Alphanumeric.
Area: Continents/country. Few geographic groupings or regions, but countries/compass points as well as administrative divisions. 400 pages of detailed classification.
Theme: Virtually nonexistent—maps assumed to be topographic, except for six broad groupings. No notation.
Scope for Area-Theme Synthesis: Poor because of lack of thematic classification.
Bias: International. Specifically map oriented.
Suitability: Special libraries—e.g., military with topographic bias.

American Geographical Society Classification (AGS)

Notation: Alphanumeric.
Area: Continents/country in random order, although Africa has degree of hierarchy. The United States is treated as a continent. Six-fold division of each country by area type and form (general, sets, regions, towns, wall maps, atlases).
Theme: 12 map-oriented classes, weighted in favor of physical features (ratio 7:4).
Scope for Area-Theme Synthesis: Wide scope within limitations of area and thematic schedules.
Bias: American. Specifically map oriented.
Suitability: Medium to large distinct collections requiring simpler classification than B/L or UDC.

University of Washington Classification

Notation: Natural language with abbreviations.
Area: Based on authority file, alphabetic order.
Theme: Based on authority file.
Scope for Area-Theme Synthesis: Infinite.
Bias: None.
Suitability: Small nonspecialist collections.

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